CLAIMS

I claim:

1. A catalytic converter and resonator combination, comprising:

a canister for installing in the exhaust system of an internal combustion engine, with said canister including an inlet end, a forward portion adjacent said inlet end, a rearward portion adjacent said forward portion, an outlet end adjacent said rearward portion, a forward inner diameter, and a rearward inner diameter;

at least one catalytic converter element installed within said forward portion of said canister, with said catalytic converter element having an outer diameter and including a substrate having a plurality of longitudinal passages therethrough, with each of said passages being defined by a plurality of substrate walls;

a resonator element installed within said rearward portion of said canister, with said resonator element having a hollow core, a forward end, a rearward end, an outer diameter, and a plurality of sound attenuating perforations formed radially therethrough;

said outer diameter of said resonator element being smaller than said rearward inner diameter of said canister, and defining a sound attenuating plenum therebetween; and

said inlet end of said canister, said plurality of passages of said catalytic converter element, said hollow core of said resonator element, and said outlet end of said canister all being axially aligned with one another for providing straight through, low restriction, free flow of engine exhaust therethrough.

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2. The catalytic converter and resonator combination according to claim 1 wherein said canister comprises a monolithic tubular shell.

3. The catalytic converter and resonator combination according to claim 1, wherein at least said canister and said resonator element are formed of corrosion resistant steel.

4. The catalytic converter and resonator combination according to claim 1, including a toroidal forward plate and a toroidal rearward plate affixed respectively to said forward end and said rearward end of said resonator element and normal thereto, for spacing said resonator element concentrically within and attaching said resonator element to said canister.

5. The catalytic converter and resonator combination according to claim 4, wherein said forward plate has a solid periphery devoid of passages therethrough for precluding exhaust gas flow therethrough, and said rearward plate includes a plurality of generally peripheral passages therethrough.

6. The catalytic converter and resonator combination according to claim 1, wherein said outer diameter of said catalytic converter element and said forward inner diameter of said canister are substantially equal, with said catalytic converter element being tightly fitted within said canister for precluding exhaust gas flow therebetween.

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7. The catalytic converter and resonator combination according to claim 1, wherein each of said passages of said substrate has a width substantially greater than .040 inch, for reducing the restriction of exhaust gas flow therethrough.

8. The catalytic converter and resonator combination according to claim 1, wherein said substrate walls of said at least one catalytic converter element are thin, for providing a large surface area to substrate volume ratio for accelerating heat transfer to said substrate walls, for correspondingly accelerating the catalytic reaction within said catalytic converter element.

9. The catalytic converter and resonator combination according to claim 1, wherein said substrate of said at least one catalytic converter element is formed of material selected from the group consisting of ceramics and Dow-Corning XT.

10. The catalytic converter and resonator combination according to claim 1, wherein said at least one catalytic converter element comprises a plurality of catalytic converter elements axially and concentrically disposed within said forward portion of said canister, said catalytic converter elements being spaced apart from one another to define at least one catalytic converter plenum therebetween and further being spaced apart from said forward end of said resonator element to define an intermediate plenum therebetween.

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11. A catalytic converter and resonator combination, comprising:

a canister for installing in the exhaust system of an internal combustion engine, with said canister including a pair of inlets, a forward portion adjacent said inlets, a rearward portion adjacent said forward portion, a pair of outlets adjacent said rearward portion, a forward inner circumference, and a rearward inner thickness;

at least one catalytic converter element installed within said forward portion of said canister, with said catalytic converter element having an outer circumference and including a substrate having a plurality of longitudinal passages therethrough, with each of said passages being defined by a plurality of substrate walls;

a first and a second resonator element installed within said rearward portion of said canister, with each said resonator element having a hollow core, a forward end, a rearward end, an outer width, and a plurality of sound attenuating perforations therethrough, with each said resonator element being disposed alongside one another;

said outer width of each said resonator element being smaller than said rearward inner thickness of said canister, and defining a sound attenuating plenum therebetween; and

said inlets of said canister, said plurality of passages of said catalytic converter element, said hollow core of each said resonator element, and said outlets of said canister all being axially parallel to one another for providing straight through, low restriction, free flow of engine exhaust therethrough.

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12. The catalytic converter and resonator combination according to claim 11, wherein at least said forward portion and said rearward portion of said canister comprises a monolithic tubular shell.

13. The catalytic converter and resonator combination according to claim 11, wherein at least said canister and each said resonator element are formed of corrosion resistant steel.

14. The catalytic converter and resonator combination according to claim 11, including a forward plate and a rearward plate, with each said plate having a pair of spaced apart resonator core passages therethrough and being affixed respectively to said forward end and said rearward end of each said resonator element and normal thereto, for spacing each said resonator element within and attaching each said resonator element to said canister.

15. The catalytic converter and resonator combination according to claim 14, wherein at least said rearward plate includes a plurality of generally peripheral passages therethrough.

16. The catalytic converter and resonator combination according to claim 11, wherein said outer circumference of said catalytic converter element and said forward inner circumference of said canister are substantially equal, with said catalytic converter element being sealed to said canister for precluding exhaust gas flow therebetween.

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17. The catalytic converter and resonator combination according to claim 11, wherein each of said passages of said substrate has a width substantially greater than .040 inch, for reducing the restriction of exhaust gas flow therethrough.

18. The catalytic converter and resonator combination according to claim 11, wherein said substrate walls of said at least one catalytic converter element are thin, for providing a large surface area to substrate volume ratio for accelerating heat transfer to said substrate walls, for correspondingly accelerating the catalytic reaction within said catalytic converter element.

19. The catalytic converter and resonator combination according to claim 11, wherein said substrate of said at least one catalytic converter element is formed of material selected from the group consisting of ceramics and Dow-Corning XT.

20. The catalytic converter and resonator combination according to claim 11, wherein said at least one catalytic converter element comprises a plurality of catalytic converter elements axially and concentrically disposed within said forward portion of said canister, said catalytic converter elements being spaced apart from one another to define at least one catalytic converter plenum therebetween and further being spaced apart from said forward end of said resonator element to define an intermediate plenum therebetween.

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21. A catalytic converter and resonator combination, comprising:

a canister for installing in the exhaust system of an internal combustion engine, with said canister including at least one inlet, a forward portion adjacent said at least one inlet, a rearward portion adjacent said forward portion, at least one outlet adjacent said rearward portion, a forward inner circumference, and a rearward inner thickness;

at least one catalytic converter element installed within said forward portion of said canister, with said catalytic converter element having an outer circumference and including a substrate having a plurality of longitudinal passages therethrough, with each of said passages being defined by a plurality of substrate walls;

at least one resonator element installed within said rearward portion of said canister, with said at least one resonator element having a hollow core, a forward portion, a rearward portion, an outer diameter, and a plurality of sound attenuating perforations formed radially through said forward portion thereof, with said rearward portion thereof being devoid of perforations therethrough;

said outer diameter of said at least one resonator element being smaller than said rearward inner thickness of said canister, and defining a sound attenuating plenum therebetween;

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said at least one inlet of said canister, said plurality of passages of said at least one catalytic converter element, said hollow core of said at least one resonator element, and said at least one outlet end of said canister all being axially aligned with one another for providing straight through, low restriction, free flow of engine exhaust therethrough;

said rearward portion of said at least one resonator element extending outwardly beyond said at least one outlet of said canister; and

said at least one resonator element being selectively axially positionable within said canister for selectively attenuating exhaust sound frequencies in a predetermined sound frequency range as desired.

22. The catalytic converter and resonator combination according to claim 21 wherein said canister comprises a monolithic tubular shell, with said sound attenuating plenum including sound absorbent material disposed therein.

23. The catalytic converter and resonator combination according to claim 21, wherein at least said canister and said at least one resonator element are formed of corrosion resistant steel.

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24. The catalytic converter and resonator combination according to claim 21, including a forward plate affixed to said forward portion of said at least one resonator element and normal thereto, for spacing said at least one resonator element within and attaching said at least one resonator element to said canister.

25. The catalytic converter and resonator combination according to claim 24, wherein said forward plate has a solid periphery devoid of passages therethrough for precluding exhaust gas flow therethrough.

26. The catalytic converter and resonator combination according to claim 21, wherein said outer circumference of said catalytic converter element and said forward inner circumference of said canister are substantially equal, with said catalytic converter element being tightly fitted within said canister for precluding exhaust gas flow therebetween.

27. The catalytic converter and resonator combination according to claim 21, wherein each of said passages of said substrate has a width substantially greater than .040 inch, for reducing the restriction of exhaust gas flow therethrough.

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28. The catalytic converter and resonator combination according to claim 21, wherein said substrate walls of said at least one catalytic converter element are thin, for providing a large surface area to substrate volume ratio for accelerating heat transfer to said substrate walls, for correspondingly accelerating the catalytic reaction within said catalytic converter element.

29. The catalytic converter and resonator combination according to claim 21, wherein said substrate of said at least one catalytic converter element is formed of material selected from the group consisting of ceramics and Dow-Corning XT.

30. The catalytic converter and resonator combination according to claim 21, wherein said at least one catalytic converter element comprises a plurality of catalytic converter elements axially and concentrically disposed within said forward portion of said canister, said catalytic converter elements being spaced apart from one another to define at least one catalytic converter plenum therebetween and further being spaced apart from said forward ~~end~~ portion of said at least one resonator element to define an intermediate plenum therebetween.

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